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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,987	06/06/2005	Lee Chen	255873US6YA PCT	2084
22850	7590	11/23/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			OLSEN, ALLAN W	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/501,987	CHEN, LEE	
	<b>Examiner</b>	<b>Art Unit</b>	
	Allan Olsen	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>July 21, 2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 15, 22-26 and 29-39 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,156,666 issued to Tokushima.

Tokushima teaches plasma etching a Ni-containing material with a carbonyl-containing etchant gas. Tokushima teaches a substrate temperature of 40° C (see abstract). Tokushima teaches that a variety of plasma apparatus (e.g., ECR, RIE, ICP) (column 7, lines 8, 9). With respect to apparatus claims 29-39, it is noted that the provision of a particular gas to an apparatus is considered to be a method step. A reference is considered to meet such a limitation in an apparatus claim as long as the apparatus of the reference is capable of performing the claimed method.

Claims 1, 2, 4, 22 and 29-39 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 02-088782 (hereinafter Hitachi).

Hitachi teaches plasma etching a Ni-containing material with an etchant gas comprising at least one of carbon monoxide, water and hydrogen halides. See JPO abstract. The apparatus of Hitachi is capable of receiving each of the claimed gases.

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Claims 1, 15, 22, 23 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by the Derwent abstract 1976-26963X of JP 51022637 (hereinafter Fujitsu). Fujitsu teaches plasma etching a Ni-containing material with an etchant gas comprising at least one of carbon monoxide and carbon dioxide.

Claims 1, 12, 22-27, and 29-39 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2000322710 (hereinafter, Mashita).

Mashita teaches plasma etching a Ni and Fe containing material with carbon monoxide as the etchant gas. Mashita teaches that a variety of plasma apparatus, including helicon wave, RIE and ICP, that are capable of receiving the claimed gas mixtures (see: figures 1 and 3; column 2, line 17; column 10, line 47).

Claims 1, 13-15, 22 and 29-39 are rejected under 35 U.S.C. 102(a) as being anticipated by US Patent 6,225,202 issued to Gupta et al. (hereinafter, Gupta).

Gupta teaches plasma etching a Ni-containing material with a carbonyl-containing etchant gas. Gupta teaches a substrate temperature of 40° C (see abstract). Gupta teaches that a variety of plasma apparatus (e.g., ECR, RIE, ICP) (column 7, lines 8, 9) that are capable of operating with the claimed gas mixtures.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 5, 7, 9, 11, 13-16, 18, 20, and 23-28 are rejected under 35 U.S.C.

103(a) as being unpatentable over Hitachi.

The JPO abstract of Hitachi recites "a gaseous etchant contg. at least one kind among carbon monoxide, water and gaseous hydrogen halides..."

Hitachi does not explicitly teach a combining CO with each of HF, HCl, HBr and HI.

It would have been obvious to one skilled in the art to use an etchant comprising one of CO/HF, CO/HCl, CO/HBr and CO/HI because through Hitachi's teaching of hydrogen halide, the skilled artisan would immediately envisaged each of HF, HCl, HBr and HI because they are very common members of a very small class of compounds.

Hitachi does not teach the flow rates of gases. Hitachi does not teach the temperature of the substrate.

It would have been obvious to one skilled in the art to optimize process variable such as flow rate and temperature.

Claims 6, 8, 10, 17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi as applied above, in view of Fujitsu.

Hitachi does not teach using CO<sub>2</sub> as a plasma etchant for Ni.

Fujitsu teaches plasma etching of Ni by using CO or CO<sub>2</sub> as an etchant.

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It would have been obvious to one skilled in the art to use CO<sub>2</sub> in place of the CO taught by Hitachi because Fujitsu teaches that CO and CO<sub>2</sub> are functionally equivalent with regard to the plasma etching of Ni.

Claims 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta.

Gupta does not teach the various types of claimed plasma apparatus (parallel plate, ICP, ECR helicon wave surface wave).

It would have been obvious to one skilled in the art to use any of the claimed plasma apparatus because Gupta teaches that "any conventional plasma etcher" may be used (col. 4, lns. 12-14).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M-F 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Allan Olsen", is written over a horizontal line.

Allan Olsen  
Primary Examiner  
Art Unit 1763